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ABSTRACT

The general purposes of this project were to test microteaching procedures for teacher training and to study relations between the process of teaching and its outcome. The project made use of "cued" video models (a short peep being superimposed whenever the model demonstrated a goal-related behavior), videotape self-feedback with self-evaluation forms to focus student attention on the particular skill, and the teaching skills of silence and nonverbal behavior. A follow-up program for a few months after treatment is planned. Of all the variables tested, only locomotion consistently showed a main effect for the factor of modeling. The contrast was between the presence and nonpresence of models, the type of model making no difference. Cuing terminal behavior was no more effective than noncuing. (Included are appropriate tables and a list of references.) (JA)

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EFFECTS OF CUED MODELLING PROCEDURES AND SELF-CONFRONTATION IN A MICROTEACHING SETTING AIMED AT DEVELOPING NON-VERBAL BEHAVIOR

Paper presented at the International Micro Teaching Symposium, Universität Tübingen, West Germany. April 10-16, 1972

by

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Uppsatsen presenterades vid the International Microteaching Symposium, Tübingen, Västtyskland 10-16 april 1972.

Microteaching är en metod för undervisningsövningar under mindre komplexa betingelser än de som råder i den ordinära klassrumssituationen. Man tränar bara en färdighet åt gången, använder en till fem elever och låter "lektionen" vara endast fem minuter. Vanligen ingår intern television som ett hjälpmedel i träningen, dels för att presentera den färdighet som skall övas och dels för att ge den övande information om övningens resultat. Titelns engelska termer "modelling" och "self-confrontation" står för dessa funktioner.

I en experimentell undersökning omfattande 48 lärarkandidater tränades förmågan att med icke-verbalt beteende styra och uppmuntra till deltagande i klassrumsdiskussion. Följande huvudhypoteser uppställdes:

1. Observation av videobandade modeller resulterar i mer icke-verbalt beteende och mer elevtal än om den övande inte får se sådana modeller.
2. Observation av videobandade modeller med auditiva signaler i samband med demonstration av målbeteende är mer effektivt än att observera samma modeller utan sådana hjälpsignaler.
3. Självkonfrontation resulterar i mer icke-verbalt beteende och mer elevtal än träningsbetingelser utan självkonfrontation.

Dessutom formulerades ytterligare fyra hypoteser bl a inkluderande samspelseffekter mellan modell- och självkonfrontationsfaktorerna. Databearbetningen gav visst stöd för den första av de ovan nämnda hypoteserna. Den andra hypotesen förkastades. Den tredje hypotesen, att självkonfrontation skulle underlätta träningen, måste besvaras mera nyanserat. Effekterna syntes till en början vara positiva för att senare övergå i negativa. Lärarkandidaternas attityder till träningsmetoden var klart positiva.

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INTRODUCTION

The micro teaching project at the Gothenburg School of Education started in the autumn of 1970. The general purposes of the project are to test micro teaching procedures for teacher training and to study relations between the process of teaching and its outcomes. The following considerations can be said to have influenced the choices we made when designing our first experimental efforts.

1. The basic format of micro teaching, including the teach-reteach cycle, small numbers of real pupils, short lessons, video-models, video-feedback and concentration on one teaching skill at a time - a format successfully applied elsewhere (Cooper & Allen 1969), should be used.

2. The "cueing" of salient features of the model, commonly provided by a supervisor, seems to be an important modelling variable (Claus 1969). This cueing function and appendant discrimination training has been shown to work with at least moderate success when automated. Young (1967), for example, provided his video-models with a supervisor's commentary mixed in on the tape itself. We further simplified when producing a "cued" model from the "non-cued" by superimposing a short peep whenever the model demonstrated a goal-related behavior. Supervisors are expensive and administratively awkward so we found it desirable to find effective procedures excluding supervisors. Accidentally this is in line with results found by Johnson & Knaupp (1970) on trainee role expectations of the micro-teaching supervisor. His analysis yielded four factors, three of which "express a desire for self-guided professional development." "The students want an opportunity to practice and to share their experiences with peers, the supervisor is put on a standby basis."

3. Means to keep the trainees alert during the observations of models and of themselves should be sought. Evaluating the available evidence on the question of videotape self-feedback vs supervisor feedback possibly combined with videotape feedback Borg et al (1970) decided to use videotape self-feedback with self-evaluation forms to focus attentation on the specific skill trained. In line with this decision we prepared a simple observation schedule which the trainees were told to use when observing the models or themselves.

4. The observational learning theory of Bandura (1970) suggests differential effects of models according to perceived competence, status and characteristics like age, sex and social power, characteristics correlated with differential probabilities of reinforcement. The sex of the model may be of importance as it relates to the sex of the observer - learner. Therefore we included the sex of the model as a factor in the experiment and had the sex of the trainee as another factor.

5. The usual measuring procedures in micro teaching research seems to be to obtain a rather naive baseline measure of performance in the first micro teaching lesson, naive in the sense that, in these experiments, the trainees were told very little about the terminal behaviors aimed at. A study by Ivey et al (1968) may serve as an example. The instructions given before the first videotaped session were simply: "Go in and talk with this student. Get to know him!" The skill aimed at but not communicated to the trainees before the first videotaping was attending behavior defined as eye contact, a certain posture, movements, gestures, and following behavior. It should not be surprising that the experimental treatments whatever they consisted of were shown to be effective. There is ample evidence that merely to inform the subjects orally in a lecture (Reed, Van Mondfrans & Smith 1970, and Millett 1969) or working through a minicourse without taking micro teaching (Friebel & Kallenbach 1969, and Langer & Allen 1970) are effective in changing relevant behavior. These are standard instructional procedures. The baseline measurement should be obtained accordingly.

6. Mostly because of assumed convenience when it comes to measuring the dependent variable, we chose the teaching skill of using silence and nonverbal behavior when directing a classroom discussion (Allen & Ryan 1969) as the behavior to be trained.

7. Berliner (1969) employed a fourth micro teaching lesson with content different from the first three to test the generality of effects. The results showed some specificity of effects. We considered it appropriate to include a similar test in our experiment.

8. The typical microteaching experience is a form of massed practice which may result in learning but also in fast forgetting. It seemed wise to plan a follow-up in the regular classrooms of the trainees a few months after treatment. The performance in this situation will, of course, also be influenced by transfer effects.

9. Measures of pupil behavior should be taken. Actually such variables represent the variables of paramount importance in micro teaching research. They can be used not only to assess the differential effects of treatments but also to relate them to the behaviors constituting the teaching skill under study, thus testing their validity.

HYPOTHESES

Extensions of some of the considerations described above yield the following hypotheses:

1. Observing videotaped models will result in more nonverbal behavior and more pupil talk than not observing such models.

2. Observing videotaped models with contiguous auditive cues at demonstrations of terminal behavior will be more effective than not observing such models.

3. Self-confrontation will be more effective than not being exposed to self-confrontation.

4. Observing a same-sexed model will be more effective than observing a different-sexed model.

5. After the initial three micro teaching lessons transfer of skills to a fourth lesson using new content will be made with differences between treatments retained.

6. Performance will decline when measured two months later in regular classrooms but differences between treatments in the micro teaching laboratory will still show up.

7. The percentage of pupil talk will be significantly correlated with the different nonverbal teacher behaviors defined.

In addition to this the data will be analyzed for interaction effects.

PROCEDURE

48 teacher candidates in the fourth term of a three-year educational program served as subjects in the experiment. A factorial design, presented in table 1, was used. As sex of trainee is interesting only in its interaction with factors of treatments it will not appear as a main source of variation in the analyses of results.

Table 1. The design of the experiment

FACTOR	LEVELS											
Model	cued				noncued				no			
Self-confrontation	yes		no		yes		no		yes		no	
Sequence of models	A	B	A	B	A	B	A	B	A	B		
Sex of trainee	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF

Symbols used: Sequence of models A = Female model - male model

B = Male model - female model

Sex of trainee M = Male

F = Female

Subjects were randomly assigned to treatment groups. Two weeks before the first subject entered the micro teaching laboratory a one-hour lecture on teachers' use of silence and nonverbal behavior in classroom interaction was given. This was followed up by written material containing definitions and examples of subclasses of non-verbal behavior such as play of features, headmovements, gestures, and locomotion. A written model based on the one appearing in Allen & Ryan (1969) was distributed. Answers to a questionnaire given immediately after the micro teaching experience indicates that the subjects had clearly perceived what was expected from them. The procedure followed in the micro teaching laboratory is depicted in table 2. Subjects in treatment groups with certain components lacking were, at the allotted time, occupied reading a research report on nonrelated content. The total time for treatment, including administrative time, was slightly more than two hours.

Table 2. Micro teaching procedure

Component	Time in minutes
Teach one	5
Observe model A (or B)	5
Self-confrontation of teach one	5
Replanning	15
Teach two (new pupils, same content)	5
Observe model B (or A)	5
Self-confrontation of teach two	5
Replanning	15
Teach three (new pupils, same content)	5
Observe both models in sequence AB (or BA)	10
Self-confrontation of teach three	5
Planning a lesson on new content	15
Teach four (new pupils, new content)	5

As is evident from the above, two model programs were developed. One using a male teacher, the other using a female teacher. They were produced with principles of observational learning in mind. Thus they both start with a view of the miniclass from the teacher's position and after a demonstration of goal-related behavior the camera

was switched to the pupils to provide vicarious reinforcement as the pupils reacted to the stimuli provided by the model teacher.

The subjects were carefully informed in a written instruction preceding the observations of models that they should be looked upon only as two examples from an infinite population of possible and relevant examples. The children serving as micro-class pupils were fetched from a number of nearby schools. Each school class served for one day with two trainees. Groups of five pupils were formed from a table of random numbers.

Three subjects for discussion were used, one for the morning trainee, one for the afternoon trainee and the third subject was used as a transfer subject in the fourth teaching session for each trainee. Each treatment group appeared once in the morning and once in the afternoon.

Approximately three months after the laboratory training subjects were scheduled for having classroom discussions videotaped in their regular classrooms during their semester of student teaching. An adaptation period of ten minutes was followed by twenty minutes of videotaped discussion. The resulting 239 videotaped lessons (one subject refused participation in the follow-up) were presented to two trained observers in a randomized order permitting calculations of interobserver agreement as well as intraobserver stability. The measurements collected were simple counts and durations. (An experiment by Morse et al, 1970, presents a good case for the use of counts instead of the more commonly used rating methods. The skill analyzed was "refocusing behavior", which was measured by self-evaluation, peer pupil ratings, observer ratings and by number of refocusing behaviors evident in the taped lesson. Only the last measure yielded significant differences between treatments.) The observations were made with the help of pushbuttons, electronic counters, and an event recorder. The apparatus and the procedures for observation, for the training of observers, and for determining agreement measures are all described in great detail by Tingsell (1972). Table 3 presents the dependent variables and their associated measures of observer inter- and intraagreement, the latter determined by observations taken 15-20 days apart.

Tabel 3. Dependent variables and associated measures of observer agreement (product moment coefficients)

Variable	Interobserver agreement	Itraobserver agreement
play of features	.87	.81
locomotion	.83	.75
pointing	.99	.98
gestures	.92	.85
headmovements	.89	.88
pupil talk, duration	.97	.97
teacher talk, duration	.94	.94

Note: All counts were transformed to counts/unit time of interaction. Pupil and teacher talk were transformed to percentages of total interaction time. Interaction time was defined as the time between the end of the teacher's introduction and the end of the lesson.

RESULTS

The data are not yet comprehensively analyzed but I would still like to present a few results in order to be able to raise questions I would like to discuss.

Results pertaining to the fourth hypothesis mentioned above will at the time be excluded. Interactions appearing without consistensy will not be commented upon.

From tables 4-7 can be seen that only one of the seven dependent variables, locomotion, consistently shows a main effect for the factor of modelling. The contrast is between the presence and nonpresence of models, type of model making no difference. The effect is retained into the transfer lesson. In teach 5 the effect falls short of being significant (the alpha-level liberally set at $p \leq .10$) but the adjusted means show the same picture.

Self-confrontation makes a positive difference in teach 2 in amount of gestures and pupil talk and a negative difference in teach 3, headmovements. Interestingly, in teach 5 (table 7) there are three significant main effects for self-confrontation, all favoring noself-confrontation. From graphs of interaction model-self-confrontation

in teach 5, and graphs based on adjusted means (not presented here) it can be seen that the favorable combinations are cued model with self-confrontation or noncued model without self-confrontation.

The regression of the different nonverbal behaviors on percentage of pupil talk was performed. Table 8 presents the results. Note that the only variable showing some significant contribution, apart from teacher talk, is locomotion. The relationship to pupil talk seems to be a negative one, the more locomotion the less pupil talk.

Table 4. Results of ANCOVA, teach 2, performance at teach 1 as covariate. F-quotients and associated probabilities under the null-hypothesis. F-quotients less than 1 are indicated with - .

Source of variation	Dependent variable						
	Play of features	Loco-motion	Pointing	Gestures	Head-movem	Pupil talk	Teacher talk
Model (M)	-	2.50$^{x)}$	1.80	-	-	1.72	1.75
Self-confront (SC)	1.03	-	-	5.69$^{xx)}$	1.33	2.95$^{x)}$	1.14
M x SC	-	-	2.08	-	1.61	-	-
M x SEX	-	-	-	-	-	-	-
SC x SEX	-	-	-	-	-	-	-
M x SC x SEX	1.22	-	-	2.69$^{x)}$	-	-	-

Note: x) $p \leq .10$
xx) $p \leq .05$

Table 5. Results of ANCOVA, teach 3, performance at teach 1 as covariate. F-quotients and associated probabilities under the null-hypothesis. F-quotients less than 1 are indicated with - .

Source of variation	Dependent variable						
	Play of features	Loco-motion	Pointing	Gestures	Head-movem	Pupil talk	Teacher talk
Model (M)	-	4.26$^{xx)}$	1.77	-	-	-	-
Self-confront (SC)	-	-	1.94	-	6.81$^{xx)}$	-	-
M x SC	-	-	-	-	1.61	-	-
M x SEX	-	-	-	2.44	-	1.89	2.70$^{x)}$
SC x SEX	-	-	-	-	-	-	-
M x SC x SEX	-	-	-	-	-	-	1.55

Note: x) $\leq .10$ xx) $\leq .05$

Table 6. Results of ANCOVA, teach 4, performance at teach 1 as covariate. F-quotients and associated probabilities under the null-hypothesis. F-quotients less than 1 are indicated with - .

Source of variation	Dependent variable						
	Play of features	Loco-motion	Pointing	Gestures	Head-movem	Pupil talk	Teacher talk
Model (M)	-	4.77$^{xx)}$	-	1.33	-	1.48	-
Self-con-front (SC)	2.38	1.26	2.65	-	2.22	-	-
M x SC	-	1.46	-	-	-	-	1.13
M x SEX	-	1.37	-	-	-	3.23$^{x)}$	-
SC x SEX	-	-	-	-	1.07	-	-
M x SC x SEX	-	1.03	-	-	-	-	1.02

Note: x)$p \leq .10$
xx)$p \leq .05$

Table 7. Results of ANCOVA, teach 5, performance at teach 1 as covariate. F-quotients and associated probabilities under the null-hypothesis. F-quotients less than 1 are indicated with - .

Source of variation	Dependent variable						
	Play of features	Loco-motion	Pointing	Gestures	Head-movem	Pupil talk	Teacher talk
Model (M)	-	1.30	-	-	1.85	-	-
Self-con-front (SC)	3.23$^{x)}$	-	-	-	7.96$^{xx)}$	4.69$^{xx)}$	2.41
M x SC	-	3.25$^{x)}$	2.65$^{x)}$	1.00	-	2.59$^{x)}$	2.38
M x SEX	3.37$^{xx)}$	-	1.42	2.35	-	-	-
SC x SEX	3.54$^{x)}$	-	-	-	-	1.45	-
M x SC x SEX	-	-	-	-	-	-	-

Note: x)$p \leq .10$
xx)$p \leq .05$

Table 8. The multiple regression of teachers' behaviors on percentage of pupil talk

Variable	Teach 1			Teach 2			Teach 3			Teach 4			Teach 5		
	Beta	Sigm	Expl variance	Beta	Sigm	Expl variance	Beta	Sigm	Expl variance	Beta	Sigm	Expl variance	Beta	Sigm	Expl variance
Play of features	.12	.18	.03	-.24	.16	.03	-.27	.14	.00	-.20	.17	-.02	-.04	.13	-.01
Locomotion	-.22	.16	.04	-.51	.15	.11$^{xx)}$	-.31	.12	.01$^{xx)}$	-.01	.15	.00	-.23	.16	-.04
Pointing	-.01	.16	.00	.07	.15	.00	.06	.12	.01	.05	.15	.01	-.20	.15	-.02
Gestures	-.10	.16	.02	.18	.13	.00	.21	.12	-.01$^{x)}$	.24	.15	.03	.35	.16	.03$^{x)}$
Head-movements	.05	.18	.01	.02	.17	.00	.30	.13	.08$^{x)}$	.16	.16	.04	.08	.16	.02
Teacher talk	-.35	.15	.12$^{x)}$	-.59	.13	.26$^{xx)}$	-.67	.12	.41$^{xx)}$	-.57	.15	.31$^{xx)}$	-.79	.14	.50$^{xx)}$
R^2			.21			.41$^{xx)}$			.50$^{xx)}$			.36$^{xx)}$			.48$^{xx)}$

Note: x) $p \leq .05$

xx) $p \leq .01$

R^2 sometimes differ from the sum of explained variances due to round-off errors

CONCLUSIONS AND DISCUSSION

Returning to the hypotheses under study the following conclusions may be advanced:

Modelling

Consistent and significant differences between levels were found only in one of six measures of teachers' nonverbal behavior, that of locomotion. The contrast is essentially one between the presence and nonpresence of models, type of model making no difference. Hypothesis 1 thus gets some support, although meagre. Hypothesis 2 is rejected: observing videotaped models with contiguos auditive cues at demonstrations of terminal behavior was no more effective than not observing such models.

Self-confrontation

Inconsistent and confusing findings appeared. The immediate effects of self-confrontation were positive but changed into negative, especially so in the follow-up recordings made three months after micro teaching. Did repeated self-confrontation result in negative emotional conditioning which inhibited performance in teach five? I would like to underline the suggestions for further research implicit in Salomon & McDonald (1969): The conditions under which a trainee perceives self-confrontation as a helpful feedback procedure and the conditions under which he perceives it as threatening should be investigated and clearly demarcated. The persuing of this line of research may be the more important if Meier (1968) is correct assuming that self-confrontation may be the most dramatic and the most effective component of the micro teaching procedure.

Interactions

A possible cause of the significant interactions model- self-confrontation may be that observing cued models effectively focused perception on the instructional behavior rather than on matters of personal appearance.

Transfer

The empirical separation of groups existing in teach three tended to be retained into the transfer lesson even if not all of them are significant, and modest support for the hypothesis in question thus

found. The discrepancy between the findings here reported and the usually positive Stanford results on videotaped feedback may to some extent be explained by different amounts of prior experience of videotaped feedback.

The follow-up

A statistical analysis of changes in performance from teach 4 to teach 5 has yet to be made. However, from inspection of adjusted means it seems evident that the increase in teacher talk and the decrease in pupil talk are real changes. The hypothesis of retained differences between treatment groups from the micro teaching laboratory into regular classrooms about three months later is not supported. A comparison of results from teach 3 and 4 with teach 5 shows that one of four significancies was retained into teach 5, which added seven unique ones. Most of those may have arisen from badly understood effects of earlier self-confrontation. The work of Bierschenk (to be published in 1972) on effects of self-confrontation may lead to significant insight into this matter.

Validity of teaching skill

Most of the teacher's nonverbal behaviors were not significantly related to percentage of pupil talk. Excluding percentage of teacher talk, which, of course, must be related to amount of pupil talk, there remained a total of about ten per cent of variance common with percentage of pupil talk. This fact added to the fact that one of the subskills, locomotion, came out with a sign not expected, points to the importance of correlating teaching skills with relevant pupil behaviors in micro teaching research.

In a guide for producers of model programs, Borg et al (1970) offer the advice that demonstrations of a teaching skill should be made redundant. Determining measures of frequency (or duration), on the models used in this experiment, in terms of z-values in the distributions of variable - values in teach 1, the following means emerged: -1.75, -.48, .04, -.48, -.82, 1.23 and .02. These figures do not indicate redundancy of demostrations.

When comparing the outcome from this experiment with that from others it should be remembered that most experiments on micro teaching have set a much more liberal base for premeasurements thus allowing more room for change.

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